```
In[3]:= Do[
       反復指定
        MGD[j] = MeanGraphDistance[RandomGraph[WattsStrogatzGraphDistribution[5 * j, 0.3]]];
                    平均グラフ距離        ランダムグラフ  ワッツ・ストロガッツグラフ分布
        Print[MGD[j]];
       出力表示
        , {j, 1, 100}]
```

1

$\frac{8}{5}$

$\frac{66}{35}$

$\frac{214}{95}$

$\frac{178}{75}$

$\frac{1187}{435}$

$\frac{1569}{595}$

$\frac{737}{260}$

$\frac{3139}{990}$

$\frac{4064}{1225}$

$\frac{4892}{1485}$

$\frac{3032}{885}$

$\frac{711}{208}$

$\frac{8357}{2415}$

$\frac{10\,241}{2775}$

$\frac{12\,327}{3160}$

$\frac{4279}{1190}$

$\frac{15\,269}{4005}$

$\frac{3437}{893}$

$\frac{1061}{275}$

$\frac{1746}{455}$

$\frac{24\,591}{5995}$

$$\frac{27\,128}{6555}$$

$$\frac{2077}{510}$$

$$\frac{31\,113}{7750}$$

$$\frac{34\,394}{8385}$$

$$\frac{38\,668}{9045}$$

$$\frac{40\,623}{9730}$$

∞

$$\frac{45\,844}{11\,175}$$

$$\frac{4679}{1085}$$

$$\frac{56\,891}{12\,720}$$

$$\frac{58\,171}{13\,530}$$

$$\frac{4908}{1105}$$

$$\frac{69\,458}{15\,225}$$

$$\frac{73\,229}{16\,110}$$

$$\frac{76\,661}{17\,020}$$

$$\frac{5426}{1197}$$

$$\frac{88\,238}{18\,915}$$

∞

$$\frac{15\,898}{3485}$$

$$\frac{100\,277}{21\,945}$$

$$\frac{106\,196}{23\,005}$$

$$\frac{18\,466}{4015}$$

$$\frac{57\,473}{12\,600}$$

$$\frac{24\,295}{5267}$$

$$\frac{126\,413}{27\,495}$$

$$\frac{27\,559}{5736}$$

$$\frac{140\,909}{29\,890}$$

$$\frac{10\,109}{2075}$$

$$\frac{30\,079}{6477}$$

$$\frac{165\,029}{33\,670}$$

$$\frac{168\,329}{34\,980}$$

$$\frac{34\,613}{7263}$$

$$\frac{36\,788}{7535}$$

$$\frac{93\,661}{19\,530}$$

$$\frac{100\,409}{20\,235}$$

$$\frac{208\,357}{41\,905}$$

$$\frac{211\,058}{43\,365}$$

$$\frac{109\,094}{22\,425}$$

$$\frac{115\,237}{23\,180}$$

$$\frac{16\,512}{3193}$$

$$\frac{80\,693}{16\,485}$$

$$\frac{52\,015}{10\,208}$$

$$\frac{263\,561}{52\,650}$$

$$\frac{3482}{705}$$

$$\frac{58\,067}{11\,189}$$

$$\frac{9799}{1921}$$

$$\frac{304\,063}{59\,340}$$

$$\frac{44\,942}{8725}$$

$$\frac{322\,366}{62\,835}$$

$$\frac{83\,873}{16\,155}$$

$$\frac{342159}{66430}$$

$$\frac{355087}{68265}$$

$$\frac{21394}{4125}$$

$$\frac{3901}{758}$$

$$\frac{381341}{73920}$$

$$\frac{402791}{75855}$$

$$\frac{410413}{77815}$$

$$\frac{4121}{798}$$

$$\frac{422989}{81810}$$

$$\frac{442333}{83845}$$

$$\frac{452384}{85905}$$

$$\frac{228013}{43995}$$

$$\frac{241833}{45050}$$

$$\frac{162352}{30745}$$

$$\infty$$

$$\frac{260111}{48290}$$

$$\frac{103063}{19758}$$

$$\infty$$

$$\infty$$

$$\frac{282527}{52785}$$

$$\frac{577457}{107880}$$

$$\frac{588624}{110215}$$

$$\frac{601834}{112575}$$

$$\frac{2600}{479}$$

$$\frac{127335}{23474}$$

$$\frac{31222}{5705}$$

$$\frac{676\,798}{122\,265}$$

$$\frac{339\,099}{62\,375}$$

In[4]:= **MGDdata = Table[{5 * j, MGD[j]}, {j, 1, 100}]**
リストを作成

Out[4]= $\left\{ \{5, 1\}, \left\{10, \frac{8}{5}\right\}, \left\{15, \frac{66}{35}\right\}, \left\{20, \frac{214}{95}\right\}, \left\{25, \frac{178}{75}\right\}, \left\{30, \frac{1187}{435}\right\}, \left\{35, \frac{1569}{595}\right\}, \left\{40, \frac{737}{260}\right\}, \right.$

$\left\{45, \frac{3139}{990}\right\}, \left\{50, \frac{4064}{1225}\right\}, \left\{55, \frac{4892}{1485}\right\}, \left\{60, \frac{3032}{885}\right\}, \left\{65, \frac{711}{208}\right\}, \left\{70, \frac{8357}{2415}\right\},$

$\left\{75, \frac{10\,241}{2775}\right\}, \left\{80, \frac{12\,327}{3160}\right\}, \left\{85, \frac{4279}{1190}\right\}, \left\{90, \frac{15\,269}{4005}\right\}, \left\{95, \frac{3437}{893}\right\}, \left\{100, \frac{1061}{275}\right\},$

$\left\{105, \frac{1746}{455}\right\}, \left\{110, \frac{24\,591}{5995}\right\}, \left\{115, \frac{27\,128}{6555}\right\}, \left\{120, \frac{2077}{510}\right\}, \left\{125, \frac{31\,113}{7750}\right\}, \left\{130, \frac{34\,394}{8385}\right\},$

$\left\{135, \frac{38\,668}{9045}\right\}, \left\{140, \frac{40\,623}{9730}\right\}, \{145, \infty\}, \left\{150, \frac{45\,844}{11\,175}\right\}, \left\{155, \frac{4679}{1085}\right\}, \left\{160, \frac{56\,891}{12\,720}\right\},$

$\left\{165, \frac{58\,171}{13\,530}\right\}, \left\{170, \frac{4908}{1105}\right\}, \left\{175, \frac{69\,458}{15\,225}\right\}, \left\{180, \frac{73\,229}{16\,110}\right\}, \left\{185, \frac{76\,661}{17\,020}\right\}, \left\{190, \frac{5426}{1197}\right\},$

$\left\{195, \frac{88\,238}{18\,915}\right\}, \{200, \infty\}, \left\{205, \frac{15\,898}{3485}\right\}, \left\{210, \frac{100\,277}{21\,945}\right\}, \left\{215, \frac{106\,196}{23\,005}\right\}, \left\{220, \frac{18\,466}{4015}\right\},$

$\left\{225, \frac{57\,473}{12\,600}\right\}, \left\{230, \frac{24\,295}{5267}\right\}, \left\{235, \frac{126\,413}{27\,495}\right\}, \left\{240, \frac{27\,559}{5736}\right\}, \left\{245, \frac{140\,909}{29\,890}\right\},$

$\left\{250, \frac{10\,109}{2075}\right\}, \left\{255, \frac{30\,079}{6477}\right\}, \left\{260, \frac{165\,029}{33\,670}\right\}, \left\{265, \frac{168\,329}{34\,980}\right\}, \left\{270, \frac{34\,613}{7263}\right\},$

$\left\{275, \frac{36\,788}{7535}\right\}, \left\{280, \frac{93\,661}{19\,530}\right\}, \left\{285, \frac{100\,409}{20\,235}\right\}, \left\{290, \frac{208\,357}{41\,905}\right\}, \left\{295, \frac{211\,058}{43\,365}\right\},$

$\left\{300, \frac{109\,094}{22\,425}\right\}, \left\{305, \frac{115\,237}{23\,180}\right\}, \left\{310, \frac{16\,512}{3193}\right\}, \left\{315, \frac{80\,693}{16\,485}\right\}, \left\{320, \frac{52\,015}{10\,208}\right\},$

$\left\{325, \frac{263\,561}{52\,650}\right\}, \left\{330, \frac{3482}{705}\right\}, \left\{335, \frac{58\,067}{11\,189}\right\}, \left\{340, \frac{9799}{1921}\right\}, \left\{345, \frac{304\,063}{59\,340}\right\},$

$\left\{350, \frac{44\,942}{8725}\right\}, \left\{355, \frac{322\,366}{62\,835}\right\}, \left\{360, \frac{83\,873}{16\,155}\right\}, \left\{365, \frac{342\,159}{66\,430}\right\}, \left\{370, \frac{355\,087}{68\,265}\right\},$

$\left\{375, \frac{21\,394}{4125}\right\}, \left\{380, \frac{3901}{758}\right\}, \left\{385, \frac{381\,341}{73\,920}\right\}, \left\{390, \frac{402\,791}{75\,855}\right\}, \left\{395, \frac{410\,413}{77\,815}\right\},$

$\left\{400, \frac{4121}{798}\right\}, \left\{405, \frac{422\,989}{81\,810}\right\}, \left\{410, \frac{442\,333}{83\,845}\right\}, \left\{415, \frac{452\,384}{85\,905}\right\}, \left\{420, \frac{228\,013}{43\,995}\right\},$

$\left\{425, \frac{241\,833}{45\,050}\right\}, \left\{430, \frac{162\,352}{30\,745}\right\}, \{435, \infty\}, \left\{440, \frac{260\,111}{48\,290}\right\}, \left\{445, \frac{103\,063}{19\,758}\right\}, \{450, \infty\},$

$\{455, \infty\}, \left\{460, \frac{282\,527}{52\,785}\right\}, \left\{465, \frac{577\,457}{107\,880}\right\}, \left\{470, \frac{588\,624}{110\,215}\right\}, \left\{475, \frac{601\,834}{112\,575}\right\},$

$\left. \left\{480, \frac{2600}{479}\right\}, \left\{485, \frac{127\,335}{23\,474}\right\}, \left\{490, \frac{31\,222}{5705}\right\}, \left\{495, \frac{676\,798}{122\,265}\right\}, \left\{500, \frac{339\,099}{62\,375}\right\} \right\}$
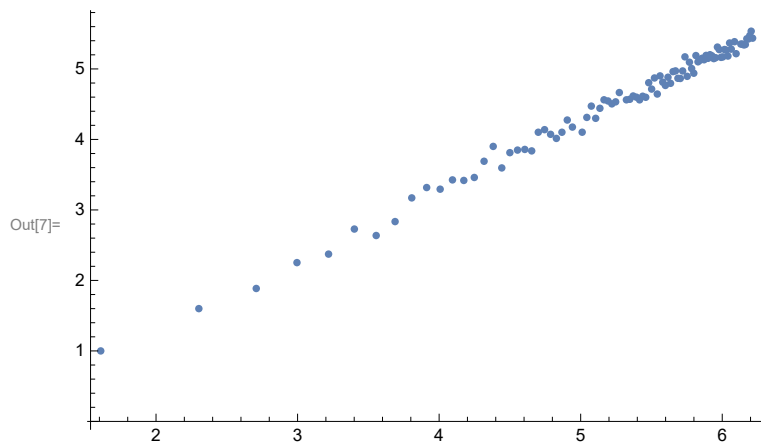
In[5]:= **ListPlot[MGDdata]**
リストプロット

Out[5]=

In[6]:= **LogMGDdata = Table[{Log[5 * j], MGD[j]}, {j, 1, 100}]**
リス… 対数
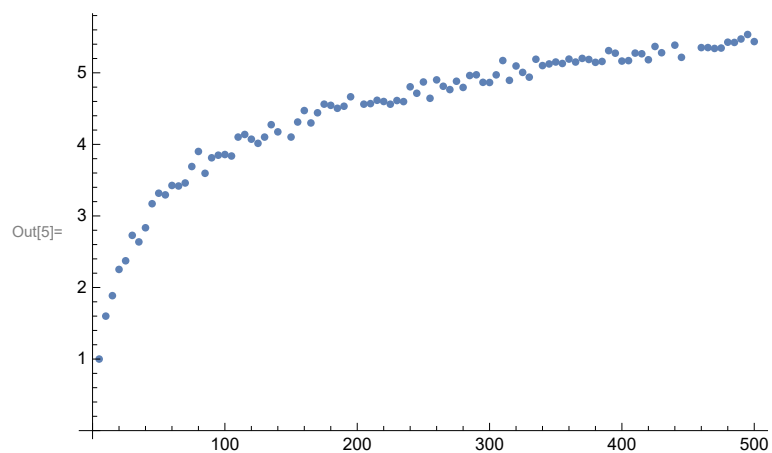
Out[6]= $\{\{\text{Log}[5], 1\}, \{\text{Log}[10], \frac{8}{5}\}, \{\text{Log}[15], \frac{66}{35}\}, \{\text{Log}[20], \frac{214}{95}\}, \{\text{Log}[25], \frac{178}{75}\},$

$\{\text{Log}[30], \frac{1187}{435}\}, \{\text{Log}[35], \frac{1569}{595}\}, \{\text{Log}[40], \frac{737}{260}\}, \{\text{Log}[45], \frac{3139}{990}\},$

$\{\text{Log}[50], \frac{4064}{1225}\}, \{\text{Log}[55], \frac{4892}{1485}\}, \{\text{Log}[60], \frac{3032}{885}\}, \{\text{Log}[65], \frac{711}{208}\},$

$\{\text{Log}[70], \frac{8357}{2415}\}, \{\text{Log}[75], \frac{10\,241}{2775}\}, \{\text{Log}[80], \frac{12\,327}{3160}\}, \{\text{Log}[85], \frac{4279}{1190}\},$

$\{\text{Log}[90], \frac{15\,269}{4005}\}, \{\text{Log}[95], \frac{3437}{893}\}, \{\text{Log}[100], \frac{1061}{275}\}, \{\text{Log}[105], \frac{1746}{455}\},$

$\{\text{Log}[110], \frac{24\,591}{5995}\}, \{\text{Log}[115], \frac{27\,128}{6555}\}, \{\text{Log}[120], \frac{2077}{510}\}, \{\text{Log}[125], \frac{31\,113}{7750}\},$

$\{\text{Log}[130], \frac{34\,394}{8385}\}, \{\text{Log}[135], \frac{38\,668}{9045}\}, \{\text{Log}[140], \frac{40\,623}{9730}\}, \{\text{Log}[145], \infty\},$

$\{\text{Log}[150], \frac{45\,844}{11\,175}\}, \{\text{Log}[155], \frac{4679}{1085}\}, \{\text{Log}[160], \frac{56\,891}{12\,720}\}, \{\text{Log}[165], \frac{58\,171}{13\,530}\},$

$\{\text{Log}[170], \frac{4908}{1105}\}, \{\text{Log}[175], \frac{69\,458}{15\,225}\}, \{\text{Log}[180], \frac{73\,229}{16\,110}\}, \{\text{Log}[185], \frac{76\,661}{17\,020}\},$

$\{\text{Log}[190], \frac{5426}{1197}\}, \{\text{Log}[195], \frac{88\,238}{18\,915}\}, \{\text{Log}[200], \infty\}, \{\text{Log}[205], \frac{15\,898}{3485}\},$

$\{\text{Log}[210], \frac{100\,277}{21\,945}\}, \{\text{Log}[215], \frac{106\,196}{23\,005}\}, \{\text{Log}[220], \frac{18\,466}{4015}\}, \{\text{Log}[225], \frac{57\,473}{12\,600}\},$

$\{\text{Log}[230], \frac{24\,295}{5267}\}, \{\text{Log}[235], \frac{126\,413}{27\,495}\}, \{\text{Log}[240], \frac{27\,559}{5736}\}, \{\text{Log}[245], \frac{140\,909}{29\,890}\},$

$\{\text{Log}[250], \frac{10\,109}{2075}\}, \{\text{Log}[255], \frac{30\,079}{6477}\}, \{\text{Log}[260], \frac{165\,029}{33\,670}\}, \{\text{Log}[265], \frac{168\,329}{34\,980}\},$

$\{\text{Log}[270], \frac{34\,613}{7263}\}, \{\text{Log}[275], \frac{36\,788}{7535}\}, \{\text{Log}[280], \frac{93\,661}{19\,530}\}, \{\text{Log}[285], \frac{100\,409}{20\,235}\},$

$\{\text{Log}[290], \frac{208\,357}{41\,905}\}, \{\text{Log}[295], \frac{211\,058}{43\,365}\}, \{\text{Log}[300], \frac{109\,094}{22\,425}\},$

$\{\text{Log}[305], \frac{115\,237}{23\,180}\}, \{\text{Log}[310], \frac{16\,512}{3193}\}, \{\text{Log}[315], \frac{80\,693}{16\,485}\}, \{\text{Log}[320], \frac{52\,015}{10\,208}\},$

$\{\text{Log}[325], \frac{263\,561}{52\,650}\}, \{\text{Log}[330], \frac{3482}{705}\}, \{\text{Log}[335], \frac{58\,067}{11\,189}\}, \{\text{Log}[340], \frac{9799}{1921}\},$

$\{\text{Log}[345], \frac{304\,063}{59\,340}\}, \{\text{Log}[350], \frac{44\,942}{8725}\}, \{\text{Log}[355], \frac{322\,366}{62\,835}\}, \{\text{Log}[360], \frac{83\,873}{16\,155}\},$

$\{\text{Log}[365], \frac{342\,159}{66\,430}\}, \{\text{Log}[370], \frac{355\,087}{68\,265}\}, \{\text{Log}[375], \frac{21\,394}{4125}\}, \{\text{Log}[380], \frac{3901}{758}\},$

$\{\text{Log}[385], \frac{381\,341}{73\,920}\}, \{\text{Log}[390], \frac{402\,791}{75\,855}\}, \{\text{Log}[395], \frac{410\,413}{77\,815}\}, \{\text{Log}[400], \frac{4121}{798}\},$

$\{\text{Log}[405], \frac{422\,989}{81\,810}\}, \{\text{Log}[410], \frac{442\,333}{83\,845}\}, \{\text{Log}[415], \frac{452\,384}{85\,905}\}, \{\text{Log}[420], \frac{228\,013}{43\,995}\},$

$\{\text{Log}[425], \frac{241\,833}{45\,050}\}, \{\text{Log}[430], \frac{162\,352}{30\,745}\}, \{\text{Log}[435], \infty\}, \{\text{Log}[440], \frac{260\,111}{48\,290}\},$

$\{\text{Log}[445], \frac{103\,063}{19\,758}\}, \{\text{Log}[450], \infty\}, \{\text{Log}[455], \infty\}, \{\text{Log}[460], \frac{282\,527}{52\,785}\},$

$\{\text{Log}[465], \frac{577\,457}{107\,880}\}, \{\text{Log}[470], \frac{588\,624}{110\,215}\}, \{\text{Log}[475], \frac{601\,834}{112\,575}\}, \{\text{Log}[480], \frac{2600}{479}\},$

$\{\text{Log}[485], \frac{127\,335}{23\,474}\}, \{\text{Log}[490], \frac{31\,222}{5705}\}, \{\text{Log}[495], \frac{676\,798}{122\,265}\}, \{\text{Log}[500], \frac{339\,099}{62\,375}\}\}$

In[7]:= `ListPlot[LogMGDdata]`
リストプロット

Out[7]=

In[12]:=
```
kara = {};
Do[
反復指定
  If[TrueQ[Part[Part[LogMGDdata, j], 2] != ∞], AppendTo[kara, Part[LogMGDdata, j]]];,
  …   真…   部分  部分                          追加割当て        部分
  {j, 1, 100}];
```
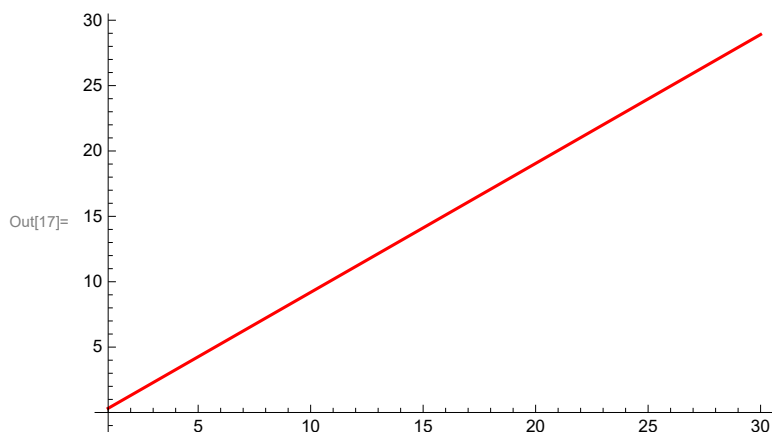
In[16]:= `logline = Fit[kara, {1, M}, M]`
フィット

Out[16]= $-0.667907 + 0.985848\,M$

In[17]:= `Plot[logline, {M, 1, 30}, PlotStyle → Red]`
プロット   プロット…   赤

Out[17]=

In[18]:= **Show[ListPlot[LogMGDdata], Plot[logline, {M, 1, 30}, PlotStyle → Red]]**
示す リストプロット   プロット   プロット…   赤

Out[18]=